REMARKS

Favorable reconsideration of the subject application, as amended above, is respectfully requested in view of the following comments.

Claims 1-5 are pending in the present application; claims 6-14 having been withdrawn from consideration.

Claims 1-4 have been amended herein merely to make that which was implicit in these claims explicit. Thus, claim 1 has been amended to clarify that the chimeric polypeptide comprises at least a portion of a first and second isoprenoid synthase. Support for this amendment is found at page 5, where the definition of isoprenoid synthase is provided. Claim 1 was further amended to recite that the chimeric polypeptide has an activity that is different from that of each of its component isoprenoid synthase components. Support for this is found at pages 12-16 and Figure 4B. Claims 2 and 3 were amended merely to provide proper antecedent basis for all of the claim limitations. No new matter is added by these amendments to the claims, nor do these amendments raise new issues requiring further searching by the Examiner.

The amendments to the claims are made merely to place the claims in condition for allowance. As such, entry of the amendments is proper and is respectfully requested.

I. Requirement for Sequence List

The Examiner asserts that the present application requires a sequence list because references to specific nucleic acids and amino acids are made in the specification and figures. The Examiner also asserts that the invention is based on specific nucleic acid and amino acid sequences since restriction sites are referred to in the specification and

without disclosure of the complete sequences, one of ordinary skill in the at may isolate variants which do not have the restriction sites.

This rejection is respectfully traversed as follows.

First, it is respectfully submitted that knowledge of the complete sequence of a polypeptide or gene is not needed to carry out the types of manipulations that are described and claimed in the present application. Indeed, historically, scientists generated chimeric polypeptides using restriction enzymes and generating restriction maps before sequencing became common place and long before the complete sequence of most genes and/or polypeptides were known. The Examiner is simply wrong in his assertions that one of skill in the art cannot carry out the claimed invention without knowledge of the sequence of the polypeptides or genes involved. For that matter, the Examiner's reasoning concerning the need for sequence because without it the "specification could not be comprehended without the amino acid sequences" is unfounded. Restriction mapping is a common tool of molecular biology and has and is often used when the sequence of a gene is unknown. Indeed, the U.S. P.T.O. has issued numerous patents based on knowledge of restriction sites and restriction mapping of genes and which do not provide nucleotide or amino acid sequences.

Furthermore, it is respectfully pointed out to the Examiner that the present application has the same specification as USSN 08/631, 341, (US 5,824,774) and USSN 09/134,699 (US 6, 072, 045), both of which issued with the same Sequence List present in the subject application. The U.S. P.T.O. did not require an extensive Sequence List in either of the direct predecessor patents and no further Sequence List is required of the present application. The rules concerning the requirement for amino acid and/or nucleotide sequences have not changed since the predecessor patents issued, and

therefore the present application should be treated in the same manner as its direct predeccessor applications.

Accordingly, the Examiner's requirement for a new sequence list is respectfully traversed.

II. Rejection of Claims 1-5 Under 35 U.S.C § 112, First Paragraph

Claims 1-5 stand rejected under 35 U.S.C § 112, first paragraph, on the ground that the specification allegedly fails to reasonably convey to one of ordinary skill in the art that applicants were in possession of the claimed invention at the time of filing the application.

Applicants respectfully disagree with the Examiner's conclusion.

The present invention is directed to chimeric isoprenoid synthase polypeptides that contain at least a portion of two different isoprenoid synthase polypeptides. The claimed chimeric polypeptides have an activity that is different from that of its component isoprenoid polypeptides.

The present specification teaches that the isoprenoid synthase gene family is highly conserved. It also teaches that the isoprenoid synthases contain highly conserved restriction sites. The specification discloses that different isoprenoid synthases have different activities and that these activities can be altered by formation of chimeric polypeptides containing portions of two different isoprenoid polypeptides. Several examples of chimeric polypeptides are provided and the assays used to determine the activities of the chimeric polypeptides are provided.

The specification teaches all of the manipulations that are necessary to generate the claimed chimeric polypeptides and teaches assays for determining the activity of the

resulting chimeric polypeptide. Thus, the present specification meets the requirements of 35 U.S.C § 112, first paragraph.

Accordingly, the rejection of claims 1-5 under 35 U.S.C § 112, first paragraph is respectfully traversed.

III. Rejection of Claims 1-5 under 35 U.S.C § 112, First Paragraph

Claims 1-5 are rejected under 35 U.S.C § 112, first paragraph. The Examiner asserts that the specification is enabling only for the generation of chimerics of tobacco TEAS and HVS genes.

This rejection is respectfully traversed as follows.

It is respectfully submitted that the present specification provides sufficient guidance to the skilled practitioner to manipulate the well-known and highly conserved isoprenoid synthases to generate chimeric polypeptides. The specification provides numerous examples of the manipulation of isoprenoid synthases to generate a variety of different chimeric proteins. Moreover, the specification teaches that highly conserved restriction sites are used to generate the chimeric polypeptides. Thus, one skilled in the art can follow the examples provided in the specification to generate other chimeric polypeptides, using the same restriction enzymes used in the specification and using the same assay to determine specificity of activity. Because these genes are so highly conserved across species, and because several restriction sites are amongst the highly conserved sequences, one of ordinary skill in the art can readily generate chimeric polypeptides that predictably retain activity. One does not have to know the structure of each and every isoprenoid synthase in order to generate chimeric polypeptides amongst this gene family. The use of the tools taught in the specification and knowledge that

these are genes constitute a highly conserved family is sufficient to enable the skilled practitioner to generate chimeric polypeptides within the scope of the claims, with the expectation that the resulting chimeric polypeptide will have an activity different from that of its component parts.

The Examiner also questions the utility of chimeric polypeptides having altered isoprenoid synthase activity and asserts that one of skill in the art would need to know the activity of the claimed polypeptide before it is generated. Applicants respectfully disagree with the Examiner's conclusions.

The present invention is directed to development of chimeric isoprenoid polypeptides that have altered isoprenoid synthase activity, the activity being determined by the two different types of isoprenoid synthases used to generate the chimeric polypeptide and the resulting structure of the chimeric polypeptide. The U.S. P.T.O. has routinely issued patents for polypeptides and genes having altered activities and this application should be treated no differently. Applicants have disclosed that the purpose of the invention is to generate isoprenoid synthases with altered activities; chimeric polypeptides that generate altered products. No further disclosure of utility is required under 35 U.S.C § 112 or 35 U.S.C § 101.

Accordingly, the rejection of claims 1-5 under 35 U.S.C § 112, first paragraph is respectfully traversed.

IV. Rejection of Claims 1-5 under 35 U.S.C § 112, Second Paragraph

It is respectfully submitted that the amendments to the claims render these grounds of rejection moot.

Accordingly, the rejection of claims 1-5 under 35 U.S.C § 112, second paragraph is respectfully traversed.

V. Rejection of Claims 1-4

Claims 1-4 stand rejected under the judicially created doctrine of obviousness-type double patenting over U.S. 5,824,744. In response, Applicant encloses herewith a Terminal Disclaimer over the cited patent.

It is respectfully submitted that the present application is in condition for allowance, an early notification thereof being earnestly solicited. If any issues remain outstanding, the Examiner is respectfully requested to contact the undersigned attorney so that prosecution of this application may be expedited.

To the extent necessary, please charge any shortage in fees due, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such account.

Respectfully submitted,

McDERMOTT, WILL & EMERY

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